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VALUE OF INDUSTRIAL WATER IN THE OSAGE (MARAIS DES CYGNES) BASIN IN KANSAS

PUBLIC HEALTH SERVICE
KANSAS CITY, MISSOURI

PREPARED FOR
KANSAS STATE BOARD OF HEALTH
TOPEKA, KANSAS

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In order to stabilize the water flow to develop the natural resources of the Osage Basin, characteristics of water usage were determined by surveying water demands of several industries representative of Osage Basin users. The value of production of one year and total employment were determined for each industry, relating production data with water demand. The value of water for the industries was determined, as well as the cost for providing water in the proposed Federal reservoirs.

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The Value of Industrial Water in the Osage (Marais Des Cygnes) Basin in Kansas

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PUBLIC HEALTH SERVICE
REGION VI

KANSAS CITY, MISSOURI

August 1, 1959

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CONCLUSIONS

1. This investigation shows that water in the Osage (Marais Des Cygnes) Basin in Kansas may have a value as high as $225,000 per acre foot, and that a sustained flow of 1 cfs may have a value of $1,300,000 annually.
2. In the uncontrolled state the flow of the stream varies greatly. Due to the variation the disposal of waste after the best available treatment is difficult. Water to assist in the treatment of these wastes appears to be economically justified in this area.
3. Due to the present low level of economic development in this basin, it is difficult to project future use by industries other than those presently operating, or those which have formerly been active in this area. Some generalizations as to the reason for this present low level of economic activity are presented.
4. Further investigations of economic and social factors should be conducted in this basin before any attempts are made to establish absolute values for future use of water. The demands, potential markets, and resources of the area must be evaluated.

ACKNOWLEDGMENTS

Office space, clerical help, and access to records were provided by the Division of Sanitation, Kansas State Board of Health.

The Kansas Water Resources Board furnished data, published and unpublished. This data was used in developing flow capabilities in this basin.

The Kansas Industrial Development Commission provided data in regard to products manufactured and employment records.

Federal agencies, whose published data were reviewed were, Corps of Engineers, Geological Survey, Bureau of Mines, Census Bureau, and the Public Health Service.

Other state agencies supplying data and records were the University of Kansas, Kansas State University, and the Division of Water Resources of the State Board of Agriculture.

In many cases, material has been abstracted from the above agencies without specific reference. A bibliography is included in this report.

INTRODUCTION

The Osage basin in Kansas is not heavily industrialized. The area has supported some industry since early settlement. Census data show that in 1875, many small plants, manufacturing articles for local use, were in operation. Coal mining was a large factor in the development of the area. The first producing oil well in Kansas and the first west of the Pennsylvania fields was drilled near Paola in 1860. The ceramic industries were early developers in the area.

Industrial development reached its peak in this area in the years from 1910 to 1930. Since 1920, the population trend has been downward. This downward trend has been due to many factors. While this report is not concerned with some of these factors, a brief discussion of them is warranted in order that a better picture of industrial growth in this area can be shown.

The population decline has been attributed to several factors, among the most important has been the increase in the size of farm units, and the partial depletion of natural resources. The increase in farm size, due to mechanization and changing crop patterns has caused many people to seek employment elsewhere. The depletion of natural resources, i. e. oil and shallow natural gas caused brick, tile, glass, and cement plants to close. Also some smelters and foundries closed. Railroads consolidated and changed their mode of operation. The change from coal to oil and gas for fuel caused many miners to seek other employment.

In addition to the above factors, water, or the lack of it has created problems in the basin. The three largest cities,

Ft. Scott, Ottawa, and Osawatomie, have had water shortages, severe enough to cause curtailment of certain activities. These shortages occurred within three years of the greatest flood the basin ever experienced (1951). The previous high flood of 1928 was followed by the drought of the 1930's.

The problem then of this basin is developing its relatively great remaining natural resources, and stabilizing its water flow to the extent that these resources can be used.

RESULTS OF SURVEY

To arrive at the characteristics of water use in the Osage basin, a survey was made of industries whose water demands appeared to be representative of basin users. The following table list these industries, their products and their water demand.

TABLE I

Industry	Product	Water Demand	
		gpd	cfs
Oil Field Repressuring	Crude Oil	4,000,000	6.19
Ottawa Municipal Power	Electricity	10,000,000*	15.47
Mackie Clemens Coal Co.	Coal	135,000	0.21
Bennett Creamery	Milk & Allied Products	730,000	1.13
Braemoor Garment Co.	Ladies Ready-to-Wear	1,000	0.001

* At capacity operation, without recycling

In each case the value of one year's production was found and the number of persons employed. The production data and water demand were then related. Table II gives the relations that existed between these factors.

Sample calculations relating to Table II are shown in the appendix to this report. Also the bibliography includes the titles of pertinent literature.

TABLE II

Plant	Product	Water Demand	Sale Value Product/yr.	Sale Value Product Vs. Water Demand
Oil Fld.Repress.	Crude Oil	6.19 cfs	$8,800,000	$1,420,000/cfs
Ottawa Mun. Power	Electricity	15.47 cfs*	500,000	32,300/cfs
Mackie Clemens	Coal	0.21 cfs	9,400,000	44,750,000/cfs
Bennett Creamery	Milk Products	1.13 cfs	6,890,000	6,100,000/cfs
Braemoor Garment	Clothing	0.001 cfs	100,000	100,000,000/cfs

* Without recycling

After the value of water for the industries was determined, the cost of providing the water in the proposed federal reservoirs was determined. Some of the cost allocations are only estimates since planning has not been completed. This data is summarized in TABLE III.

TABLE III*

Reservoir	Water Supply Storage Allocation (1000 a.f.)	Cost/a.f.	Dollars Water Supply Cost	Firm Yield cfs	Cost/cfs Firm Yield	Yield cfs/ac.ft.
Pomona	56	$65.5	$3,668,000	17	$215,765	
Melvern	42	96	4,032,000	13	310,154	
Garnett	18	175	3,150,000	15	210,000	
Hillsdale	7.4	51	377,000	7	53,857	
Ft. Scott	0	125	0	0	0	
Ft. Scott**	20	125	2,500,000	21	119,048	
Without Ft. Scott	123.4	Ave.96.9	11,227,000	52	Ave.197,444	1cfs/2373Ac.ft
With Ft. Scott	143.4	Ave.102.5	13,727,000	73	Ave.181,765	1cfs/1964Ac.ft.

* Kansas State Water Resources Board
** With Possible Storage Allocation.

NOTE: Under present authorization, the Ft. Scott Reservoir does not have any storage allocation. The figures presented here are only estimates based on the hydrologic capabilities of the site.

FUTURE PROJECTIONS

Presently the Osage Basin in Kansas is not heavily industrialized; in fact it has not fared as well as the rest of the state. In trying to discover the reasons for this underdevelopment, the factors which make an area desirable for industrial growth were noted. The factors to be desired are: the availability of raw material, including a water supply; availability of markets for produced goods, availability of necessary labor, a satisfactory plant site which will provide space and flood protection, good transportation facilities, a good tax structure, power, and certain items, such as housing, etc., which concern prospective employees.

Investigation of the above various items disclosed the following facts. Raw materials for most basic industries are available. Good reserves of coal, oil, and gas are either in the basin or are relatively close. A large market for products is within a 100 mile radius. Good labor is available, in fact, a surplus of industrial labor exists in this basin due to the closing of old industries, railroad shop relocations, and depleted natural resource developments. Plant sites are available and in certain locations the plant buildings of closed industries are available at very low prices. Tax structures are normal. Electric power is available at present, although any expansion would necessitate the expansion of generation facilities. Transportation facilities are excellent, in fact, railroads are more than adequate for great expansion. Due to the decline in population, housing exists in many of the towns. The housing will need some rehabilitation, this would provide employment for many non-industrial tradesmen.

There is not now, nor in the forseeable future will there be, a problem as to the quantity or quality of the water available; however, the problem of regulating flows so as to provide a more uniform flow is very acute even at present. Any great increase in industrial activity will require expansion of municipal water systems. The majority of industries now in the basin use municipal water due to the high first cost of developing their own supplies. If the industries are successful more people would be attracted to the area so that the actual use of water by the population would also be increased. Large industries would tend to develop their own supplies.

Based upon the data presented in TABLE II and TABLE III, the following general statements can be made in regard to future development of the Osage Basin in Kansas. Except for one case, which will be discussed separately, the value of water for industrial development in this basin exceeds $1,000,000 per guaranteed annual flow of one cfs. It could be as high as $100,000,000. These values were established largely upon basic resource development and do not reflect the use of water by an industry producing a high valued finished product. Such industries exist in the basin but data was not available for analysis. If they had been considered the value of the water probably would have been greater.

The one instance of low value represents water being used to cool condensers in a steam generation plant. This is for a single pass installation. With modern cooling towers and recycling, the value of this water could be much higher.

No investigations were conducted regarding the value of water for dilution of wastes since none are being discharged directly into the streams. All are discharged into municipal treatment plants. There are two possible exceptions to this statement. Some oil field brines are lost and find their way into the main river. These oil brines are being used in oil field repressuring operations and have considerable value.* If lost they must be either be replaced with treated fresh water or with treated salt brine pumped especially for this purpose. They have a low chloride content and a comparatively low volume. The river shows a very low chloride content (average 19 ppm) below these operations. Local intermittant streams on occasion have shown values as high as 3000 ppm.

The other possible source of untreated wastes is the drainage from stripped coal pits (this does not apply to shaft mining operations). Records and tests of the Kansas State Board of Health do not show this to be a serious source of pollution on the main stem of the Marais Des Cygnes river; but several tributary creeks show high sulphate and sediment pollution. No municipal water supplies are involved, but illness in cattle has been reported. Some of the abandoned open pits have been developed into wild life and fishing areas.

* Calculations made during this study showed a possible high value of $6.80/1000 gals.

BIBLIOGRAPHY

1. The Marais Des Cygnes River Basin Plan, Division of Water Resources, Kansas State Board of Agriculture (1950, unpublished)

2. D. F. Metzler, "Recommended Action Against Effects of Severe Droughts in Kansas", Journal American Water Works Association, Vol. 48, No. 8 (August, 1956)

3. Monthly Review, Federal Reserve Bank of Kansas City (October, December, 1958; February, April, 1959)

4. Quality of Surface Waters of the United States, U.S.G.S. Water Supply Papers, Dept. of Int. Geological Survey (Various issues to date)

5. Surface Water Supply of United States, (Various issues to date). Dept. of Int. Geological Survey.

6. Report of Kansas State Board of Agriculture, Division of Water Resources, Stream Flow Data. 1895 - 1947.

7. Public Health Service Drinking Water Standards, Federal Security Agency, Public Health Service (March, 1946).

8. Proposed Practices for Economic Analysis of River Basin Projects, Subcommitee on Evaluation Standards (May 1950, Revised May, 1958).

9. Rosebraugh, V. H., "The Engineering Design of Municipal Water Supply Reservoirs," Engineering Experiment Station, Bull. No. 80, Kansas State College, Manhattan, Kansas, (August, 1956).

10. D. F. Metzler and H. A. Stoltenberg, "The Public Health Significance of High Nitrate Waters as a Cause of Infant Cyanosis and Methods of Control," Trans. of the Kansas Academy of Science, Vol. 53, No. 2, (1950)

11. Robert S. Ingols, "Impoundment and Water Quality - Effect of Impoundment on Downstream Water Quality, Catawba River, S. C. " Journal of American Water Works Association, Vol. 51, No. 1 (January, 1959).

12. Water Resources Development by the U.S. Army Corps of Engineers in Kansas, Southwestern Division, Dallas, Texas, (January, 1959)

13. A Directory of Kansas Manufacturers and their Products, Kansas Industrial Development Commission, Topeka, Kansas, (1958 - 59 Ed.)

14. Water in Kansas, A Report to the Kansas State Legislature, The Kansas State Finance Council, (January 1955)

15. Quality of the Water Supplies of Kansas, Water Supply Paper No. 273. Dept. of Int. Geological Survey (1911)

16. The Composition of the River and Lake Waters of the United States, Dept. of Int. Geological Survey (1924)

17. Charles E. Staley, The Kansas River, Center for Business Research, University of Kansas, Unpublished manuscript, (August, 1959)

18. J. P. Powell, Results of Water Flooding in Kansas Oil Sands Containing Viscous Crude Oils, Dept. of Int., Bureau of Mines Inf. Cir. No. 7873. (1959)

19. The Industrial Utility of Public Water Supplies in the United States, 1952. Part 2. State West of the Mississippi River, Dept. of Int. Geological Survey. Water Supply Paper 1300. (1954).

APPENDIX

Sample Calculations:

Mackie Clemens Coal Co., Mulberry, Kansas
Coal washing, sizing, and preparation
100 employees
375 tons/hr. capacity
value $10.00 ton
135,000 gpd (water from deep wells at present)
One year's production, 940,000 tons.
Value of one year's production:

10 x 940,000 = $9.400,000.
Water use 135,000 gpd = 0.21 cfs.
9,400,000/0.21 = $44,750,000/cfs/year.

GEOGRAPHIC LIST OF INDUSTRIES IN THE MARAIS DES CYGNES RIVER BASIN

Allen.....Allen Locker Plant.

Baldwin.....Hey Machinery Co., Implement wheel conversions, farm trailers, airplane tires.

W. R. Vermillion Co., Wood novelties
Baldwin Elevator Co., Feed.

Blue Mound.....The B-M Mower Co., Power Lawn Mowers.
Benson Gate Co., Farm Gates.

Burlingame.....Burlingame Coop. Elevator Co., Process seed.
Burlingame Ice Co., Ice
Burlingame Frozen Food Center, Meat Processing, canning, custom slaughtering, smoked turkeys.
Satzler Bros. Ice Cream Co., Ice Cream.
Sutherland - Baker Laboratories Inc., Cleaners and anti - fogging compounds; synthetic lubricant and chemical specialties.

Trindell's Hatchery, Chicks, broilers.

Fort Scott.....Edward Aaron Corporation, Poultry; eggs
American Service Co., Ice
Banner Dairy Products, Cheese; butter; ice cream.
The Borden Company, Evaporated milk.
Bruce Marble & Granite Works, Granite monuments and mausoleums.
Central Mfg. Co., Steel wheels and power lawn mowers.
C. E. Cleveland Lithochrome Co., Coloring for stone and glass; stone adhesive; stone waterproffer.
E. C. Eversole Stave Co., Barrel Heads.
Flour Mills of America, Inc., Feed.
Fort Scott Coca-Cola Bottling Company, Soft Drinks.
Fort Scott Dehydrating Corp., Inc., Dried eggs.
Fort Scott Foundry, Brass and aluminum castings.
Fort Scott Hydraulic Cement Co., Inc., Cement (natural and masonry)
The Fort Scott Individual Mausoleum Co., Mausoleums and burial vault.
Fort Scott Mattress & Awning Co., Mattresses; awnings.
Fort Scott Packing Co., Meats.
Fort Scott Pottery Co., Inc., Flower pots and artware; hotelware.
Frisco R. R.; Railroad Division Point.
Goodlander Mills Co., Feeds
Harvest Brand Mineral Company, Poultry grits; stock minerals; calcium carbonate.
Hayden Planing Mills, store fixtures; refrigerated candy case; occasional tables (walnut and limed oak)
Key Work Clothes, Inc., Overalls, work pants, work shirts.

Fort Scott..cont'd..
Leffler Foundry, Gray-iron castings; sash weights.
Merker Machine & Boiler Works, Machine shop work.
Monarch Brass & Aluminum Works, Nonferrous castings
Mount Marble & Granite Works, Monuments.
Nor-Vell, Inc., Flour mill machiner, supplies and repair parts (sifters, sieve frames, bleaching machines, etc.)
Plaza Sheet Metal Co., Sheet metal work.
Royal Crown Bottling Co., Soft drinks.
Standard Advertising & Printing Co., Inc. Calendars; funeral supplies; fans and advertising novelties; commercial printing.
Sunflower Hatchery, Poultry; chicks.
Sunny Cal Bottling Co., Orange, grape and pineapple juice.
Winchell Mfg. Co. Rotary power lawn mowers.
Zephyr Ventilated Awning Co. Wood and aluminum awnings.

Gardner.....The Cramer Chemical Co. Athletic trainers' supplies; first aid supplies.
Fishburger Company, Catfish bait

Garnett.....Brundred Oil Corp.,Oil production
W. H. Cramer & Son Mfg. Co., Poultry coops; dog shipping crates; sanitary cream can washers; sheet metal products.
Dalton Mfg. Co. Wire products (crates, grills hangers, baskets, display racks.
Elliott's Dairy, Milk, cottage cheese, ice cream.
Garnett Church Furniture & Mfg. Co., Church furniture
Garnett Ice & Cold Storage Co. Ice; custom slaughtering
Garnett Rock Company, Crushed rock and agricultural limestone.
Newman Mfg. Co., Children's clothing.
Seymour Poultry, chicks
Sunshine Hatchery, chicks
Twin Valley Dairy Products, Milk

Greeley.....Greeley Coop. Assn., Feed

La Cygne.....La Cygne Products Co., Awnings, aprons, cloth caps, waterproof duck.

Lane.....Gerth's Breeder Hatchery, Broilers, chicks.

Lebo.....J. C. Lewis & Son, Machine shop and welding
Lind Fabricating Co., Load binders, and t.v. towers.

Louisburg.....Panhandle Eastern Pipe Line Co.

Lyndon.....Lyndon Broom Co., Brooms
Lyndon Packing Co., Meat Products.
Grange Coop Assn., Process grain & seed.

Melvern.....Dresenbury Limestone Products Co., Agricultural Lime, limestone.

Moran.....The Perkins Grain Co., Process seed.

Mound City.....Morando Seed Co., Process grain and seed.

Mulberry.....Clemens Coal Co., Coad
Dungan Broom Co., Brooms
Mulberry Elevator Co., Feed.

Osage City.....Osage Mfg. Co., Jackets, slacks, skirts.
H. W. Sturdy Grain Co., Process grain & seed;
Process alfalfa.
Vosler & Ellison, Oil Production.

Osawatomie.....Missouri Pacific R.R. Shops (shutdown)
Mode O'Day Corp., Ladies' blouses.
Osawatomie Farmers Co-op. Union, Feed
Harry A. Pyle, Salad dressing
Caylor Oil Co. Oil Production.
Miami County Locker Co., Custom butchering.
Sloan-Zook Oil Co. Oil production.
Pure Gold Dairy, Milk & general dairy products.

Ottawa.....American Service Co., Ice.
Antone's, Poultry packing.
Baldwin-Ward Mfg. Co., Inc. Combine cutter bar controls and bin unloaders; milk can hoist, truck mounted hoist, aerial crane.
The Bennett Creamery Co.; Butter, condensed milk, ice cream mix, spray power; ice cream.
Bruce Co., Inc. Denim pants, whipcord jackets, blanketlined jackets (shipcord and denim)
Buildex, Inc., Expanded shale aggregate.
Cement Brick Products Co. Crecrete bricks and septic tanks, ready-mix concrete.
Farmers Elevator Co., Feed; process seed.
Jayhawk Beverages, Inc. Soft drinks.
J. V. Mitchell Mfg. Co. Poultry and turkey coops, feeding batteries.
Loux Hatcheries, Poultry; chicks.
Middleton's Bakery, Bread; pastry.
Mode O'Day Corp. Women's dresses; house dresses, robes.
National Sign Company, Inc. Steel road signes and blackboards.
Clarence G. Nauman, Walnut andother native lumber.
The Ottawa Coca-Cola Bottling Co., Soft drinks.
Ottawa Millwork Co., Millwork; cabinets.
Ottawa Steel Products, Inc., Hydraulic front end loaders; hydraulic concrete breakers and backfill tampers; heavy duty backhoe.
Ottawa-Warner Mfg. Co., Wood sawing equipment; fertilizer spreader; post-hole diggers.
Bert Ross, Crushed stone and chat, agricultural lime.
Finch Oil Co. Oil Production
Rantoil Oil Co. Oil Production
Reno Locker Co., Custom butchering
Rock Crusher
Zero Food Locker, Custom butchering.

Overbrook.....Overbrook Farmers Union Co-Op. Assn, Feed.

Paola.....Buchman Seed & Feed Co. Feed; process seed.
Fluor Corporation, ltrd. Piping systems, pipe bends; pulsation dampeners, cooling tower distribution systems; fin fan heat exchangers, gas cleaners and air washers, mufflers (large gas and diesel engines); angle iron rolling.
Ingersoll Machine & Welding Co., Heavy machine shop work.
Monteith Missouri Corporation, Automotive generators, starter, armatures (rebuilt)
Paola Butter Company, Butter
Paola Mill & Elevator, Feeds.
Pure Gold Dairy, Ice Cream
Shawnee Mfg. Co., Ladies sportwear.
Smart Matron, Inc., Ladies' coats and suits.
Teen Modes, Inc., Misses' coats and suits.
Trio Manufacturing Corp. Boat trailers; welding.
Western Steel Products Co. Culverts and other drainage prod.
Sohio Petroleum Co.

Pleasanton..... Braemoor Garment Co., Ladies Ready-To-Wear.
Pleasanton Ice & Locker Co., Ice
Pleasanton Mill & Elevator Co., Feed.

Pomona.....Lindsey Grocery & Locker, Meat Products.

Prescott.....Sinclair-Hume Coal Co., coal.

Quenemo.....Missouri Timber Co., Barrel heads.

Rantoul.....Brundred Oil Corp., Oil Production.

Reading.....Morris Lumber Co., Process seed.

Vassar.....Fagan Locker Service, Meat Products.
Vassar Elevator Co., Feed.

Waverly.....Turvey Produce, Poultry, eggs.

Wellsville.....Elmer's Welding and Tank Co., Oilfield storage tanks.

CITIES IN MARAIS DES CYGNES BASIN

WITH WATER SYSTEMS BUT NO SEWERAGE SYSTEM.

Town.	Remarks.	Population('58)
Allen		211
Bronson		412
Carbondale		618
Eskridge		536
Louisburg	Planning initiated.	838
Mound City.	Plans approved.	656
Mulberry		741
Overbrook	Plans approved.	452
Pomona		495
Reading		262
Richmond		365
Spring Hill	Planning initiated.	816
Union Town		199
Waverly		495
Williamsburg		284
TOTAL		7,380

INDUSTRIAL - GROUND*
Applications for Permit to Appropriate Water for Beneficial Use

Name	Drainage Basin	Use	Source	Rate c.f.s.	Quantity ac.ft./yr.	Location of Diversion Qtr.	Sec.	Twp.	Rge.
ATSFRR	Pottawatomie Creek	Ind	Well	.0223	.12	SW	35	215	19E
"	" "	"	"	.0223	.06	"	"	"	"
"	Cole Creek	"	"	.0223	.09	NE	9	19	14
"	Rock Creek	"	"	.0223	.06	SE	14	19	16
Clemens Coal Co.	Cox Creek	"	2 wells	1.782	239	SE	24	28	25
ATSFRR	MDC	"	Well	.0223	.6	SE	6	17	18
"	"	"	"	.0223	.03	SE	18	18	18
Phillips Pipeline Co.	Big Bull Creek	"	"	.0223	3.	NW	18	15	22
K.C. Power & Light Co.	MDC	"	2 wells	1.11	37	NE	5	20	24
Phillips Petroleum Co.	"	"	well	.223	4.6	SW	3	18	23
Burlingame Ice. Co.	Dragoon Creek	"	"	.1114	61.	Lot12, Blk 9	-	15	14
ATSFRR	110 Mile Creek	"	"	.0223	.06	NE	4	15	15
"	MdC	"	"	.0223	.06	SE	16	18	15
"	"	"	"	.0223	.06	NW	10	18	16
"	Dragoon Creek	"	"	.0223	.18	SW	5	14	13
"	"	"	"	.0223	.12	NW	34	14	13
	TOTAL----------			3.4940	346.04				

* From files of Div. of Water Resources, Kansas St. Board of Agriculture.

INDUSTRIAL - SURFACE*
Applications for Permit to Appropriate Water for Beneficial Use

Name	Drainage Basin U	Use	Source	Rate c.f.s.	Quantity ac.ft./yr.	Location of Diversion Qtr.	Sec.	Twp.	Rge.
MKT RR	Little Osage Creek	Ind	Surf.	0.334	34.	NE	14	24S	20E
Mo.Pac. RR	Cedar Creek	"	"	0.668	39.	NE	17	21	19E
Bennett Creamery	Marais des Cygnes	"	"	1.894	353	Block 32			
Moracaibo Oil Co.	" " "	"	"	0.356	236	NW	15	17	21
Fred W. Hensick	Hickory Creek	"	"	1.33	0.02	SE	20	16	21
Concrete Mat. & Con Co.	Marais des Cygnes	"	"	26.7	2500	SE	6	17	20
ATSF RR	Bull Creek	"	"	0.312	49.	E	7	15	22
Mo. Pac. RR	Pottawatomie Creek	"	"	2.67	936	NW	14	18	22
" " "	N. Wea Creek	"	"	0.56	123.7	S	17	16	24
Panhandle Eastern Pipeline	Rabbit Creek	"	"	0.33	179	SW	5	17	25
Panhandle Eastern Pipeline	Wea Creek	"	"	3.34	50	NE	32	16	24
ATSF RR	MdC	"	"	0.624	123.	NW	15	17	17
" "	Dragoon Creek	"	"	0.156	.09	NW	34	14	13
	TOTAL SURFACE			39.274	4622.81				
	TOTAL SUR + GRD			42.768	4968.85				

* From files of Division of Water Resources, Kansas State Board of Agriculture.

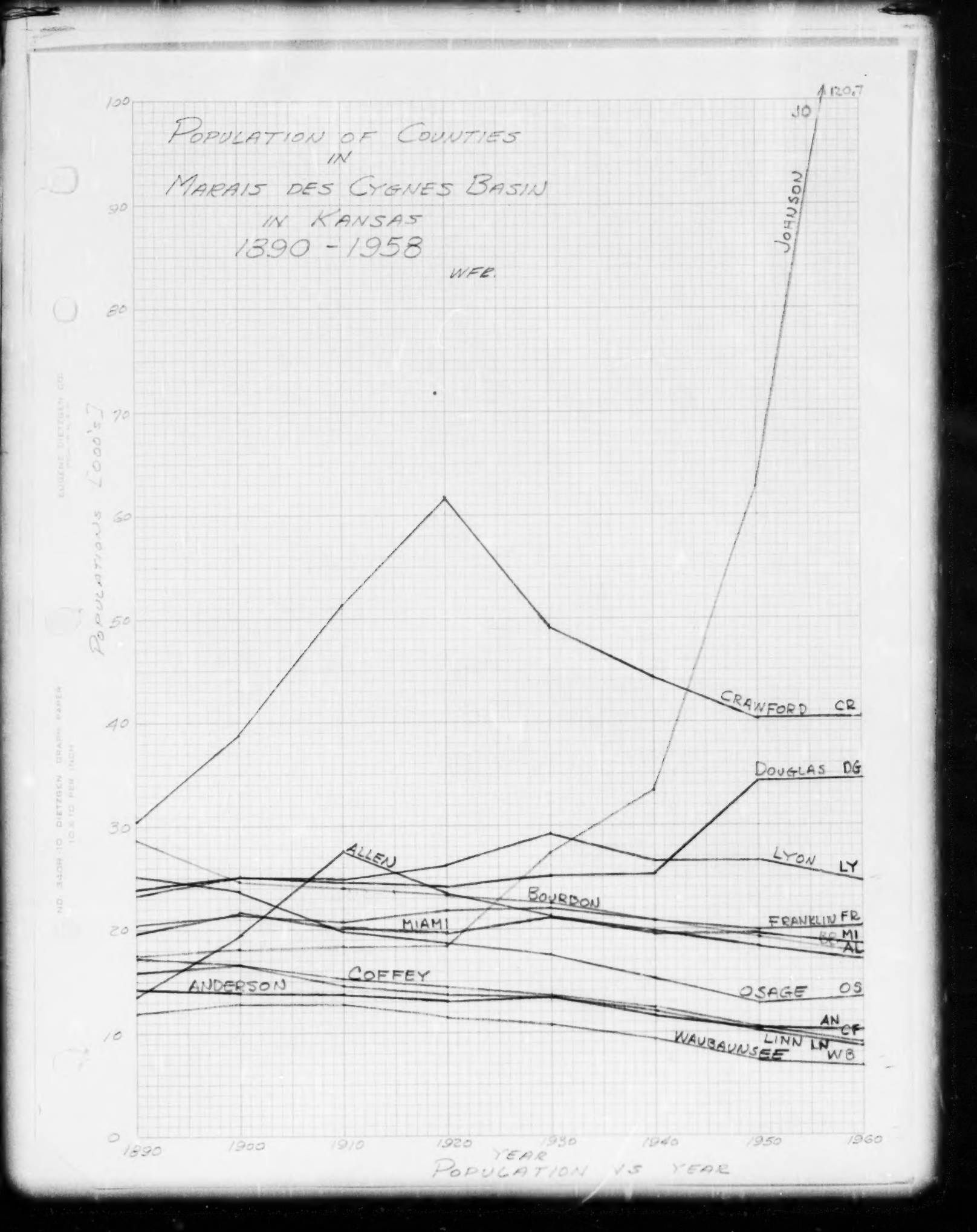
MARAIS DES CYGNES RIVER BASIN

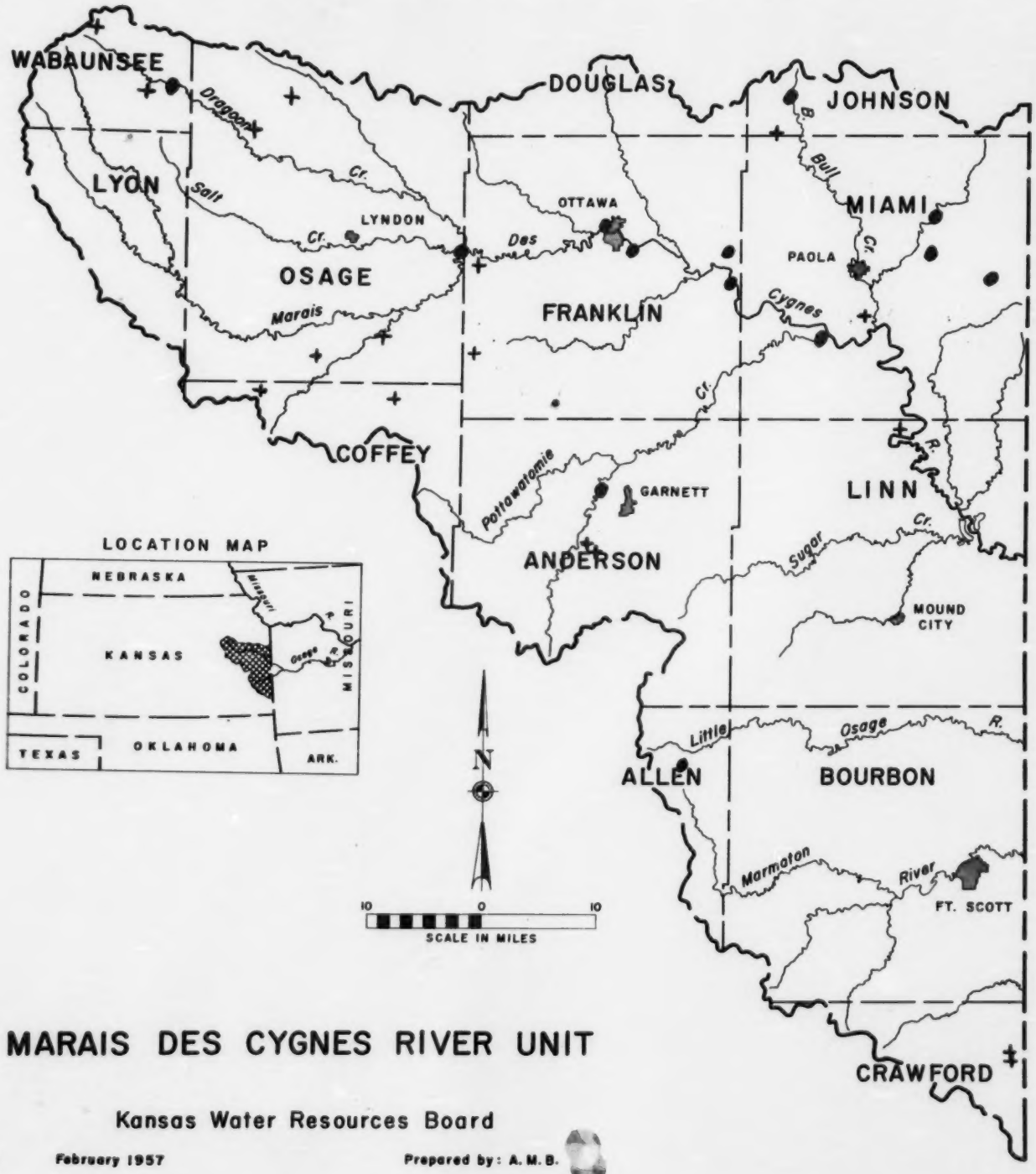
Industrial Water Supplies from Company-Owned Sources**

Location	Industry	Chief Product	Principal Water Use	Source	Average Pumpage, MGD		
					Ground Water	Surface Water	Total
Burlingame	Burlingame Ice Co.	Ice	Product	Wells	0.005	-	0.005
Edgerton	A.T. & S.F.R.R. (Recently donated to city)						
Louisburg	Panhandle-Eastern PipeLine Co.	Compressor Station	Cooling	Impoundment on Rabbit Cr.			
Moran	M.K. & T.R.R.		Watering locomotives(?)	Impoundment on Little OsageR.			
Mulberry	Clemens Coal Co.	Coal	Washing coal	Wells	0.135		0.135
Osawatomie	Caylor Oil Co.*	Crude Oil	Repressuring	Wells	0.004		0.004
Osawatomie	Mo. Pac. R.R.			Impoundment on Pottawatomie Cr.			
Osawatomie	Sloan-Zook Oil Co.*	Crude Oil	Repressuring	Wells	0.090		0.090
Ottawa	Bennett Creamery	Dairy Product	Cooling	Marais des Cygnes River		0.580	0.580
Ottawa	Concrete Materials & Construction Co.	Crushed Rock	Washing	Marais des Cygnes River		7.0	7.0
Ottawa	Finch Oil Co.*	Crude Oil	Repressuring	Wells	0.008		0.008
Ottawa	Rantoul Oil Co.*	Crude Oil	Repressuring	MdC River		0.210	0.210
Paola	Sohio Petroleum Co.*	Crude Oil	Repressuring	Wells	0.147		0.147
Prescott	Sinclair-Hume Coal Co.*	Coal	Washing coal	Strip Pits		0.240	0.240
Rantoul	Brundred Oil Co.*	Crude Oil	Repressuring	Impoundment on Kay Cr.		0.187	0.187
Richmond	A.T.&S.F.R.R.		None at present.	Impoundment			
Welda	A.T.&S.F.R.R.		None at Present.	Impoundment			

* No Water Right Application.

** This list compiled from Files of State Board of Health.


POPULATION OF COUNTIES
IN
MARAIS DES CYGNES BASIN
IN KANSAS
1890 - 1958
WFB.
POPULATIONS (000's)
YEAR
POPULATION VS YEAR
JOHNSON
120.7
CRAWFORD CR
DOUGLAS DG
LYON LY
ALLEN
BOURBON
MIAMI
FRANKLIN FR
BR MI
AL
COFFEY
ANDERSON
OSAGE OS
AN
CF
LINN LN
WAUBAUNSEE WB
0
10
20
30
40
50
60
70
80
90
100
1890
1900
1910
1920
1930
1940
1950
1960



INDUSTRIAL WATER USERS HAVING SEPARATE SUPPLY

● Surface

+ Ground

Location as given on applications for diversion to Kansas State Board of Agriculture Division of Water Resources.

MARAIS DES CYGNES RIVER UNIT

Kansas Water Resources Board

February 1957

Prepared by: A. M. B.